GRASSROOTS JOURNALS

Grassroots Journal of Natural Resources, Vol.7 No.3 (December 2024)
ISSN: 2581-6853 | CODEN: GJNRA9 | Published by The Grassroots Institute
Website: https://grassrootsjournals.org/gjnr | Main Indexing: Scopus and WoS

ISSN 2581-6853 | 7(3) Dec 2024

M – 00470 | Research Article

Typology Model of Emotional Intelligence Development in Civil Servants Engaged in Implementing Sustainable Development in Ukraine

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How to cite this paper: Podolchak, N., Karkovska, V., Tsygylyk, N. and Dziurakh, Y. (2024). Typology Model of Emotional Intelligence Development in Civil Servants Engaged in Implementing Sustainable Development in Ukraine. *Grassroots Journal of Natural Resources*, 7(3): s70-s91. Doi: https://doi.org/10.33002/nr2581.6853.0703ukr04

Received: 29 July 2024
Reviewed: 10 September 2024
Provisionally Accepted: 21 September 2024
Revised: 30 September 2024
Finally Accepted: 10 October 2024
Published: 30 December 2024
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Abstract

In the contemporary context of global crises, such as the COVID-19 pandemic and the Russian-Ukrainian conflict, public servants' efficacy in managing natural resources critically depends on their emotional intelligence (EI). This study examines the critical role of EI in public servants managing natural resources during the COVID-19 pandemic and the Russian-Ukrainian conflict. These crises underscore the necessity of understanding public servants' emotional resilience, anxiety levels, and social competence to enhance their effectiveness and adaptability. The research explores whether public servants can be categorized into more than three typologies of EI development. It hypothesizes four distinct types: "Child", "Student/Pupil", "Specialist/Worker", and "Professional/Manager" characterized by unique combinations of emotional intelligence, anxiety, and social competence. A structured survey was administered on 150 public servants across Ukraine via Google Forms, covering demographic and professional variables. A refined sample of 30 participants, balanced by gender, geographic region, and service category, was subjected to cluster analysis. The findings revealed clear distinctions among the proposed typologies. The "Child" type represents individuals with low EI, high anxiety, and limited social competence, while the "Professional/Manager" type includes those with advanced EI, minimal anxiety, and strong social skills. Intermediate types, "Student/Pupil" and "Specialist/Worker," exhibit developmental trajectories toward higher emotional intelligence and professional competence. This typology provides a practical framework for designing tailored interventions aimed at improving the emotional intelligence of public servants. Recommended strategies include stress management techniques, mentoring, and continuous professional development programs. This study offers a novel approach to understanding and addressing the emotional and professional needs of public servants during periods of uncertainty.

Keywords

Civil servants; Emotional intelligence; Covid period; Typology models; Public administration; Sustainable development

Introduction

The relevance of emotional intelligence (EI) in public administration has significantly increased, particularly during the COVID-19 pandemic and ongoing conflicts (Ilichok *et al*., 2023). These challenges have placed immense pressure on public servants, requiring innovative approaches to decision-making and sustainable management of resources. In this context, the development of emotional intelligence has emerged as a key factor in enhancing the adaptability and effectiveness of public servants. Global trends are driving substantial transformations in public administration, particularly in the integration of advanced technologies and the intellectualization of processes (Masyk *et al*., 2023; Podolchak, 2022). Such changes are vital for improving collaboration between administrative authorities and stakeholders, especially under conditions of uncertainty. Emotional intelligence serves as a crucial competency for ensuring effective communication, decision-making, and resilience among public servants, which directly impacts organizational performance and sustainability.

Emotional intelligence plays a pivotal role in professional achievements, contributing to team cohesion and organizational success. Understanding and developing EI are especially relevant in modern public administration, where the ability to manage emotions, reduce anxiety, and enhance social competence is crucial. Despite the growing importance of this competency, research on its role in public administration remains limited, particularly regarding its application in crisis management and sustainable resource governance. By focusing on emotional intelligence, this study addresses a critical gap in the literature, offering insights into its impact on public servants' ability to navigate complex challenges. This investigation underscores the need for public management systems to incorporate EI development into training programs, thereby fostering more resilient and effective personnel capable of adapting to rapidly changing circumstances. The development of one's potential for emotional intelligence, and the acquisition of new emotional competencies is becoming an increasingly common phenomenon. The question of emotional intelligence is of interest to many researchers and theoreticians, and it is especially relevant to the field of public administration. Scientists distinguish the components of this human ability in different ways and offer different possible explanations for its functioning (Boruc, 2019). Among the most common theories is Meyer and Salovey's model (Meyer and Salovey, 1990), which distinguishes skills that support emotional functioning: evaluating and regulating emotions, as well as using emotions in action. The second important model is Goleman's (1997) model, which presents five main elements that form emotional intelligence: the ability to recognize and name one's own and others' emotions, manage emotions, the ability to motivate oneself, and the ability to maintain relationships with people. Bar-On's (2000) model of emotional intelligence, which includes stress control, individual elements of mood – optimism and happiness – and reality check, is another theoretical construct of the discussed topic that has gained relevance. In this model, the ability to control one's reactions is important, which is called the impulse control component (Gayathri and Meenakshi, 2013). Discussion of the concept of emotional intelligence obliges us to define its two components: emotions and intelligence. Psychology, which has emotions as one of its main objects of interest, has divided the mind into three parts since the 18th century: cognitive, affective, and motivational (Mayer and Salovey, 1999).

The development of emotional intelligence is a multiphase process consisting of the previously mentioned competencies, from the recognition of emotions to their effective control and management (Piotrowski, Gulla and Jaskułowski, 2011). A deficit of emotional intelligence is associated with consequences, which include: limited or impossible understanding of one's own emotional experiences; incompetent expression of emotions, which can lead to rumination, weakening of control over emotional manifestations or violation of the influence of emotions on the actions taken. Emotions cause difficulties in effective mobilization and in choosing the right course of action, as well as in choosing its direction (Podolchak, Tsygylyk and Dziurakh, 2022; Shpak *et al*., 2021; Sribna *et al*., 2023). Perhaps we are dealing here with the concept introduced by Goleman (1997), which is emotional illiteracy, which consists of the lack of ability to understand complex interpersonal contexts.

Despite the numerous empirical studies conducted on the very concept of emotional intelligence, little can be found in the literature on its determinants. The development of emotional intelligence occurs under the influence of the individual's experiences, which are recorded in the autobiographical memory, that is, in the one that refers to the past. Behavioural models studied by Lazarus and Folkman (1987) and Rongińska and Gaida (2001) underscore the significance of individual capabilities and interpersonal relationships in managing professional demands. The theoretical and methodological basis of the development of a typology model of emotional intelligence development is the presence of three levels of general emotional intelligence in all known models for its assessment. In particular, its levels are defined as: low, medium and high. However, the components of emotional intelligence are different in all models. Mayer and Salovey conceptualized emotional intelligence as the ability to perceive, understand, utilize, and manage emotions, a framework operationalized through the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) (Mayer *et al*., 2004). Goleman (1997) created a model that considers emotional intelligence as a set of skills that can be developed separately, which are self-awareness, self-management, social awareness and relationship management. His view of emotional intelligence stems from his inability to accept a narrow, biological definition of intelligence in which intelligence quotients are inherited and invariant over life experience (Goleman, 2007). He also defines a person's potential ability to acquire practical skills based on self-awareness, motivation, self-direction, empathy, and good relationships with other people (Goleman, 2007). According to Yelkikalan *et al*., 2012), its level increases with age. This is because it is largely acquired and thus develops throughout life through experience (Goleman, 2007). Emotional intelligence affects task performance as well as achievement (including academic performance (Yelkikalan *et al*., 2012).

The role of emotions in human life is extremely important, especially when it comes to significant events (Lazarus, 1991). Emotions are an expression of how a person relates to a certain reality, and how they perceive and interpret this reality. It is emotions that guide human choices and behaviour (Gasiul, 2007). They can be defined as a direct reaction of the organism to environmental stimuli (Podolchak, Tsygylyk and Dziurakh, 2022). They are the generator of further reactions on the physiological, physical, psychological and, accordingly, social levels. Emotions determine the way or style of communication (both verbal and non-verbal) and its perception and therefore play a role in the formation of relationships. Especially in the formation of significant, close ones, but also - they also

protect against the formation of some. The genesis of primary emotions, such as fear or disgust, is related to the survival instinct. Both fear and disgust in their primary form are designed to warn of danger (TenHouten, 2006; Podolchak *et al.*, 2023; Podolchak *et al.*, 2022). The biological aspect of this phenomenon is to protect the life and survival of the species. Its psychosocial dimension, on the other hand, consists of preventing entry into risky relationships or interactions that may become a burden. It is important to accurately interpret your own emotions, as well as to correctly assess the emotional state of people with whom you interact. The ability to recognize one's own emotions and the emotions of other people is a component of emotional intelligence.

In addition to managing emotions and the level of emotional intelligence, social competence also determines effective social functioning. Matczak and Knopp (2013) consider emotional intelligence as a basis for the formation of social competence. Like emotional intelligence, social competencies are also developed to a large extent through social activity, and contacts with other people and are correlated with each other. Social competence is an acquired skill that can be effectively applied in various social situations. Social competencies include the following skills: adaptability (ability to adapt and be flexible in different situational contexts); emotional connection (ability to form satisfactory emotional relationships and receive social support); effective communication (ability to read other people's intentions, interpret their messages and adequately respond to them); the ability to achieve one's own goals (dexterity in actions and interpersonal relations) (Henne, 2003). They are useful for improving collaboration and problem-solving. They contribute to one's development and overcoming difficulties, the ability to get along with people, to get to know and support them. Due to them, a person is accepted by others (Otrębski and Rutkowska, 2006). Along with emotional intelligence social competencies also determine effective social functioning. Matczak and Knopp (2013) consider emotional intelligence as a basis for the formation of social competencies. Like emotional intelligence, social competencies are also developed to a large extent through social activity, and contacts with other people and are correlated with each other. The connection of emotional intelligence with self-awareness, self-control, motivation, empathy, social skills, and communication skills causes its direct impact on the effectiveness and efficiency of the performance of tasks (Podolchak, Prokopyshyn-Rashkevych and Karkovska, 2019; Yelkikalan *et al*., 2012). However, to date, there are no scientific works that would assess the degree of impact of COVID-19 on the level of emotional intelligence and, therefore, the model of levels of emotional intelligence.

In light of the above knowledge, this study aims to develop a typological model for the development of emotional intelligence, which involves the specification of types for the possibility of developing emotional intelligence in the workplace for public servants. We hypothesize that there are more than three distinct types of emotional intelligence models among public servants during the COVID-19 pandemic, characterized by their levels of emotional intelligence, anxiety, and social responsibility. Establishing a clear number of types of the model of emotional intelligence will make it possible to recommend specific methods of developing their soft skills and build reasonable career plans with a high degree of probability of implementation in practice due to a more accurate knowledge of their types of the model of emotional intelligence. To test this hypothesis, the study was guided by the following objectives:

(1) to form a country-wide sample of public servants, ensuring even gender distribution and a manageable size (30 participants) for effective statistical analysis;
(2) to identify types of emotional intelligence models based on levels of emotional intelligence, anxiety, and social competence during the COVID-19 pandemic, using quantitative data derived from validated surveys;
(3) to use cluster analysis to distinguish different types of emotional intelligence development models;
(4) to validate the classification of public servants into specific emotional intelligence types through statistical evaluation.

Methodology

Design of Survey and Sampling

The study employed a survey designed in Google Forms, comprising three sections. The first section collected demographic and professional data, including age, gender, territorial residence (North, South, West, East, or Center of Ukraine), affiliation to the public service category (A, B, or C), and length of service. The second section evaluated emotional intelligence using the Hall test, measuring components such as self-awareness, emotional regulation, empathy, and interpersonal skills. The third section assessed anxiety using the GAD-7 test and social competence through a validated set of questions targeting adaptability, emotional connection, and communication abilities.

From the total sample of 150 public servants, 30 were selected for detailed analysis. The research group included 10 respondents from each public service category (A, B, and C), with an even distribution by gender and territorial residence across Ukraine. Specifically, two participants from each region (North, South, West, East, and Center) were selected per category to ensure geographic and professional representation. This categorization was applied to minimize sampling bias and provide balanced data for subsequent cluster analysis.

The selected group had an average age of 35 years, with a standard deviation of ±10 years. While approximately half of the respondents were aged 24–30, about a third were aged 40–60, ensuring representation across different experience levels. Social competence was assessed using the 360° feedback method, a multidimensional approach that incorporates evaluations from supervisors, peers, and self-assessments (Nowack, 2009) (Figure 1). This method provided a comprehensive view of interpersonal and professional skills, with results scaled from 0 to 1 for use in cluster analysis.

Figure 1 illustrates the typology model of emotional intelligence development, according to which the emotional intelligence of personnel was analyzed at different levels of development. In particular, the type of development “Professional/manager” corresponds to a high level of emotional intelligence, “Specialist/worker” and “Student/pupil” corresponds to an average level, and “Child” corresponds to a low level.

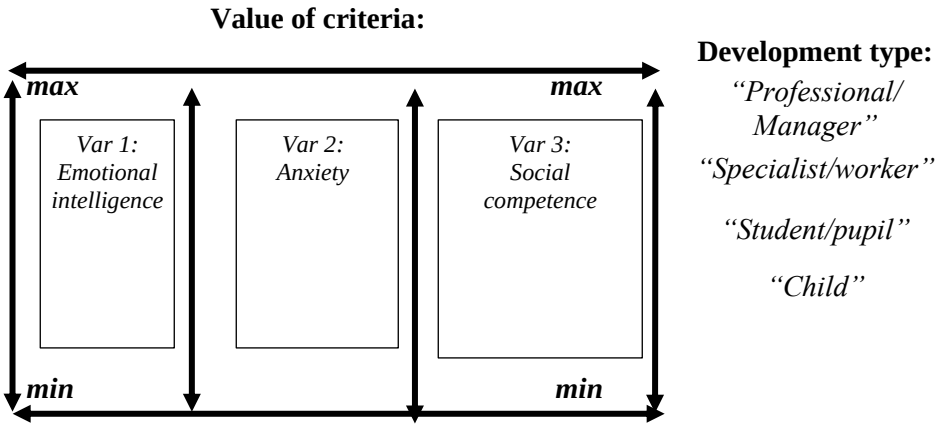


Figure 1: Typology model of emotional intelligence development
* formed by the authors based on Caruso (2008), and Goleman (1997).

Statistical Analysis

For clustering, three key parameters were used: emotional intelligence (measured using the Hall test), anxiety (assessed through the GAD-7 test), and social competence (evaluated from survey responses). The clustering process involved constructing a similarity dendrogram using Ward's method with Euclidean distances as the measure of similarity or dissimilarity. Based on the dendrogram, the optimal number of clusters was determined using the "elbow method" and analysis of significant jumps in cluster formation. The identified clusters were further refined using the k-means method to allocate the studied criteria to specific types. Finally, average values of classification features within each cluster were analyzed, and the clustering results were interpreted to identify dependencies between the selected criteria.

Levels of Emotional Intelligence and Their Evaluation

The study classified emotional intelligence (EI) into three levels: low, medium, and high. These levels were derived from the Hall test, a validated instrument widely used to measure EI. The test evaluates self-awareness, emotional regulation, interpersonal skills, and empathy, which are critical components of emotional intelligence (Mayer and Salovey, 1997). Public servants were categorized into distinct EI levels based on their test scores, scaled between 0 and 1 for analysis. Low EI corresponds to challenges in recognizing and managing emotions, medium EI reflects moderate proficiency and high EI indicates advanced emotional competence, including the ability to empathize and maintain effective social interactions. These levels provided a framework for cluster analysis, enabling the identification of developmental typologies. The classification into EI levels was essential for understanding the variability in public servants' emotional and social competencies. Emotional intelligence significantly impacts decision-making, stress management, and professional interactions, making it a critical factor in assessing public servants' effectiveness during crises. By categorizing participants into distinct levels, the study aimed to provide actionable insights for targeted interventions and professional development strategies.

Results

Overview of Emotional Intelligence Typology

The formation of social competence is critical in modern society, as it determines an individual's success in daily life, enabling adaptation, influence over life events, and the development of personality orientations (Shpak *et al*., 2022). Globalization and societal progress further emphasize the need for such qualities to establish universal principles and support personal growth. Globalization and societal progress increase the need for qualities that uphold universal principles and foster personal development.

The characteristics of the model of the typology of the development of emotional intelligence provide for the formation of a specific type of development of the emotional intelligence of an individual, in particular:

Developmental type "Child":

This developmental type includes 16% of the respondents, and was the least prevalent among the public servants. In the cluster analysis, public servants identified as the "Child" type exhibited lower scores in emotional intelligence and social competence, alongside higher anxiety levels. This group requires targeted interventions to foster emotional growth, including training in emotional regulation and social skills. The high level of intelligence of the parents is a kind of potential for the development of this intelligence in the child. In turn, such parental guidelines as a high level of activity, availability, flexibility and a positive attitude are also positively correlated with the level of emotional intelligence of children. The most important role in the formation of emotional competence is played by the process of socialization of the child in the family environment. The social conditions in which the child develops, and the upbringing to which this child is exposed, make up a complex of social determinants of emotional intelligence.

As for psychological affiliation, the level of the "child" cycle characterizes a mature person who feels, thinks, acts, speaks and reacts as in childhood. Such a person is in constant doubt and complex. A person lives in tension and is afraid to take unnecessary or wrong steps. The person has a constant struggle with herself for anything. In this state, a person will always adapt to others, it is difficult for him/her to adapt to the environment in which he/she is, such people, are often offended and make claims to others. As a result of such considerations, the person becomes disappointed in life and neglects the opportunity to use the experience gained to exclude similar mistakes in the future.

Development type "Pupil/Student":

This group included 27% of the respondents, highlighting its prevalence among public servants. At this level of the cycle of emotional intelligence, there is an opportunity to acquire appropriate social competencies, the ability to manage emotions and develop emotional intelligence. All this is possible in the case of the positive influence of educators, in particular parents, and teachers. At this level, there are many opportunities for purposeful development and learning. For an adult, the level of the "Pupil" cycle is

characterized by the opportunity to acquire knowledge, skills and competence to a greater extent, which corresponds to a professional direction. In addition, this level of the emotional intelligence development cycle is characterized by a lack of stability in the perception of the situation. The so-called emotional illiteracy is also associated with the growth of adolescent problems (Piotrowski, Gulla and Jaskułowski, 2011), in particular: impaired self-control and emotional expression, lack of ability to recognize and name experienced emotions, cognitive disorders of self-control, low self-esteem, lack of ability to predict consequences own actions, a negative image of the world, lack of a sense of the meaning of life, lack of empathy, etc. Problems in these areas usually begin in childhood, and if timely measures are not taken to rehabilitate a person, – his/her deficit will begin to affect more and more broad areas of his/her functioning. This will contribute to irreversible damage to the emotional and social sphere of the personality, which will not function properly in adulthood (Boruc, 2019). Both a deficiency of emotional intelligence and a low sense of quality of life.

At the "Student" level of development emotional intelligence and social competence develop to a large extent through social activity, and contacts with other people and are positively correlated with each other. At this stage a wide range of opportunities for acquiring skills in various directions and self-improvement are present, however, the general environment is an important factor in the development of students' emotional intelligence. If this level is low, it is likely to hurt the student, lead to behavioural and emotional maladjustment, and problems at this age and, as a result, may affect his/her academic performance and success in adulthood. Therefore, this level of the cycle can also be characterized as such that the control of emotions, social competence and emotional intelligence is expressed by the perception of the "Student" by the environment.

Development Type "Specialist/Worker":

This developmental type includes 37 % of the respondents and was most prevalent among the public servants. High emotional intelligence in itself does not guarantee that a person with it will be able to use emotional skills at work. However, it is a lever to achieve the opportunities included in its mandate. For example, excellent customer service is the result of highly developed empathy. The same applies to trust in a person, which is an expression of competence based on the ability to manage oneself (self-regulation), i.e. to control impulses and emotions. Emotional intelligence is extremely important when it comes to communication. Key elements of effective communication depend on the ability to "put yourself in the shoes" of the recipients of messages. Highly emotional people, as it were, unconsciously pay attention not only to external factors, such as the tone of voice or facial expression of the interlocutor, but, above all, they subjectively perceive, analyze and evaluate the perceived stimuli.

It's hard to overstate the importance of emotional intelligence in the workplace. Having a high level of emotional intelligence and social competence in combination with a low level of anxiety, that is, the ability to manage emotions will positively affect the professional career of employees at all levels: from better communication to increased productivity and leadership skills. In addition, with the increasing globalization of many companies, emotional intelligence plays an especially important role at work. Multicultural teams must learn to understand each other, express their opinions and

views, and adapt to their differences. Employees also have to deal with increasingly complex relationships with consumers and colleagues. Thus, having the emotional ability to empathize, interact, and collaborate with people from other social groups will improve work performance and effectiveness. A distinctive feature of those who have reached the highest positions in their careers is persistence, the ability to build partnerships, the willingness to make efforts and the ability to seek help from more experienced people.

Development Type "Professional/Manager":

This developmental type includes 20 % of the respondents, highlighting its prevalence among public servants. The type of development "Professional/manager" is characterized by high social competence, in particular, an acquired skill that can be effectively applied in various social situations. Social competencies include the following skills: adaptability (ability to adapt and be flexible in different situational contexts); emotional connection (ability to form satisfactory emotional relationships and receive social support); effective communication (ability to read other people's intentions, interpret their messages and respond appropriately to them); the ability to achieve one's own goals (dexterity in actions and interpersonal relationships) (Henne, 2003). They are useful for improving collaboration and problem-solving. They contribute to one's development and overcoming difficulties, the ability to get along with people, to get to know and support them. They make a person acceptable to others (Otrębski and Rutkowska, 2006). Therefore, the level of the cycle "Professional / manager" can still be interpreted as a formed effective leader. A leader's lack of interpersonal communication skills negatively affects the work of all his subordinates – it leads to wasting time, causes bitterness, weakens motivation and commitment, and causes anger, hostility and apathy. A leader's high emotional intelligence, or lack of it, can be measured by the organization's gains or losses in using the talents of subordinates.

Broadly speaking, emotional intelligence is the ability to recognize, manage, and use one's own emotions and the emotions of others. This means that people with high emotional intelligence can easily recognize the emotions that they and others feel. They can also regulate their emotions and use them to accomplish a variety of tasks and responsibilities while helping others achieve the same. Public servants are a group consisting primarily of heads of departments, services, departments, etc. The second, more numerous part of the staff consists of specialists in various fields of activity.

The specifics of the work of heads/managers in the field of public administration consists in the management of subordinate personnel, i.e. it is a process consisting of three elements: power, leadership and management. This function of the manager is reduced to finding and applying the best way to transform resources into planned results; the manager's function is to enter into two-way relations, as a head and as a subordinate (Stępień, 2002), and the function of a leader is to rally followers, exert influence, create a vision of development and motivate people to action (Kanarski, 2002). The appropriate level of a managerial position requires from the head/manager (public servant) not only knowledge of management and practice, but also relevant social skills, in particular, this awareness and desire to satisfy the basic needs of the team, and not only material or official, but also emotional, as they are clearly defined addictions and official relations

significantly narrow the individual's opportunities for action. In addition, the created image of a public servant as a mentally strong person makes it difficult to overcome difficulties and, as a result, can lead to emotional disorders (Florkowski, 2000). Therefore, the skills he/she possesses in terms of managing his/her emotions will certainly be useful in his day-to-day work as a public servant. A modern public servant, in addition to mastering and using specialized knowledge, must also be good at social skills, which is undoubtedly facilitated by a high level of emotional intelligence (Jaworowska and Matczak, 2001). Based on this, three key categories were chosen, which served as the basis for conducting cluster analysis.

Data and Cluster Formation

The data in table 1 was derived from a structured survey conducted among a sample of 30 public servants, selected from a larger pool of 150 respondents. The survey collected information on three key variables: emotional intelligence (Var 1), anxiety (Var 2), and social competence (Var 3). These variables were assessed using validated tools: the Hall test for emotional intelligence, the GAD-7 test for anxiety, and a set of survey questions to evaluate social competence.

Additionally, demographic and professional details were recorded, including age, gender, place of residence (North, South, West, East, or Center of Ukraine), and public service category (A, B, or C). The 30 respondents were selected to ensure a balanced representation across these categories, with even gender distribution and geographic representation. The collected data was then scaled between 0 and 1 to standardize it for further statistical analysis, including clustering.

Table 1: Input data for cluster analysis of the formation of types of emotional intelligence development

No.	*Var 1: Emotional intelligence*	*Var 2: Anxiety*	*Var 3: Social competence*	*Age*	*Gender*	*Place of residence*	*Public service category*
1	0.90	0.10	0.80	49	F	Center	A
2	0.95	0.0	1.00	60	M	East	A
3	0.78	0.10	0.80	43	M	North	A
4	0.98	0.05	1.00	47	M	West	A
5	0.60	0.30	0.55	36	M	East	B
6	0.72	0.20	0.64	25	F	North	C
7	0.82	0.15	0.76	43	F	West	A
8	0.64	0.26	0.70	32	M	North	B
9	0.75	0.12	0.74	53	M	South	A
10	0.93	0.10	0.90	40	F	North	A
11	0.81	0.20	0.75	28	F	North	B
12	0.54	0.40	0.49	24	F	Center	C
13	0.63	0.34	0.50	25	M	Center	C
14	0.48	0.60	0.63	31	M	South	B
15	0.73	0.21	0.65	30	F	Center	B
16	0.37	0.41	0.36	28	F	West	C

No.	*Var 1: Emotional intelligence*	*Var 2: Anxiety*	*Var 3: Social competence*	*Age*	*Gender*	*Place of residence*	*Public service category*
17	0.70	0.19	0.73	51	M	Center	A
18	0.86	0.10	0.89	43	F	East	A
19	0.34	0.71	0.33	26	F	East	C
20	0.91	0.07	0.90	40	F	South	A
21	0.67	0.54	0.61	27	F	West	B
22	0.84	0.23	0.79	29	M	West	B
23	0.25	0.85	0.19	25	F	South	C
24	0.31	0.76	0.29	29	M	Center	B
25	0.52	0.48	0.43	27	M	East	C
26	0.29	0.93	0.15	24	M	North	C
27	0.66	0.25	0.63	25	M	West	C
28	0.73	0.19	0.78	33	F	South	B
29	0.33	0.74	0.35	48	F	East	B
30	0.49	0.58	0.67	41	M	South	C

Based on table 1, a similarity dendrogram based on Euclidean distances was constructed, shown in figure 2.

The most significant associations, which correspond to the "jumps" of the Ward graph, are characteristic of the optimal number of clusters, which is determined by calculating the difference between the number of examined criteria and the step corresponding to an obvious "jump". Therefore, it is possible to combine into four clusters.

The results obtained using the analysis of the union graph (Figure 2) coincide with the results using the conglomerative method. The criterion for further selection from among the options for the number of classification groups, in particular four, is the maximum number of indicators that will be significant for this multifactor grouping (Figure 3). The advantage of this method is the ability to check the statistical significance of differences between selected clusters.

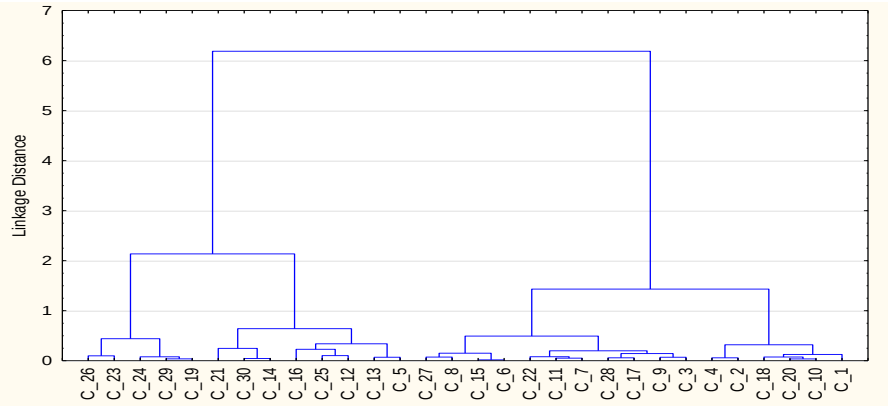
The variability of the formed clusters is described by values from 0 to 1 and the following characteristics:

Claster – 1: type "pupil/student" criteria Var 1: Emotional intelligence, Var2: Anxiety, Var3: Social competence is within the average level;

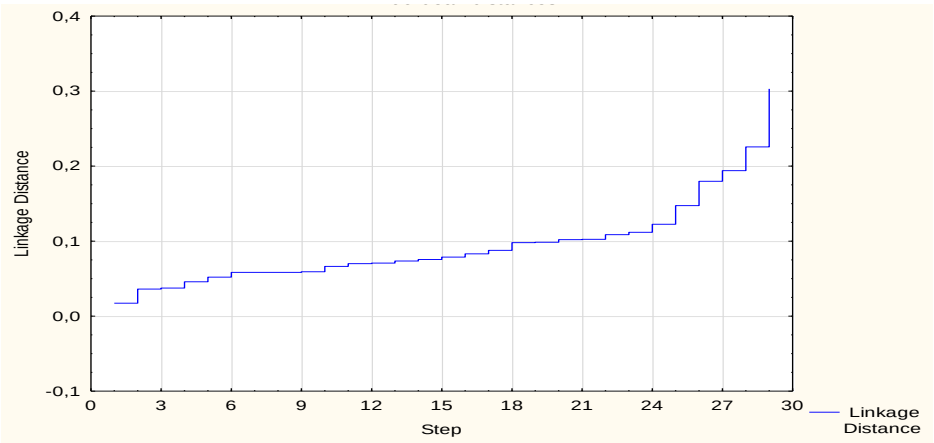
Claster – 2: type "child" criterion Var 1: Emotional intelligence, Var3: Social competence - the lowest, Var2: Anxiety – the highest.

Claster – 3: type "specialist/worker" criteria values Var 1: Emotional intelligence, Var3: Social competence – above average, Var2: Anxiety – below average.

Claster – 4: type "professional/manager (leader)" criterion Var 1: Emotional intelligence, Var3: Social competence – the highest, Var2: Anxiety – the lowest.



(a)



(b)

Figure 2: Dendrogram of the formation of clusters and the graph of unification of the types of development of emotional intelligence: a) Tree Diagram for 30 Cases Ward`s method Euclidean Distances; b) plot of Linkage Distances across Steps Eucliden Distances

Validation of Hypothesis

Table 2: Averaged values of criteria for clustering types of emotional intelligence development (*k*-means clustering results dialogue)

Criterion	*The average value of cluster formation*	*Standard deviation*	*Dispersion*	*Number of surveyed respondents in the Covid-19 period*
Cluster – 1: type “pupil/student”				
Var 1	0.537	0.095	0.009	8
Var 2	0.456	0.111	0.012	
Var 3	0.530	0.105	0.011	
Cluster – 2: type “child”				
Var 1	0.304	0.035	0.001	5
Var 2	0.798	0.090	0.008	
Var 3	0.262	0.087	0.007	

Criterion	*The average value of cluster formation*	*Standard deviation*	*Dispersion*		*Number of surveyed respondents in the Covid-19 period*	
Cluster – 3: type "specialist/worker"						
Var 1	0.743	0.064	0.004		11	
Var 2	0.190	0.050	0.002			
Var 3	0.724	0.061	0.003			
Cluster – 4: type "professional/manager (leader)"						
Var 1	0.921	0.041	0.001		6	
Var 2	0.070	0.040	0.001			
Var 3	0.915	0.075	0.005			
Variable	Analysis of Variance					
	Between SS	df	Within SS	df	F	Signif. p <
Var 1	1.239	3	0.119	26	90.082	0.001
Var 2	1.838	3	0.152	26	104.322	0.001
Var 3	1.342	3	0.174	26	66.517	0.001

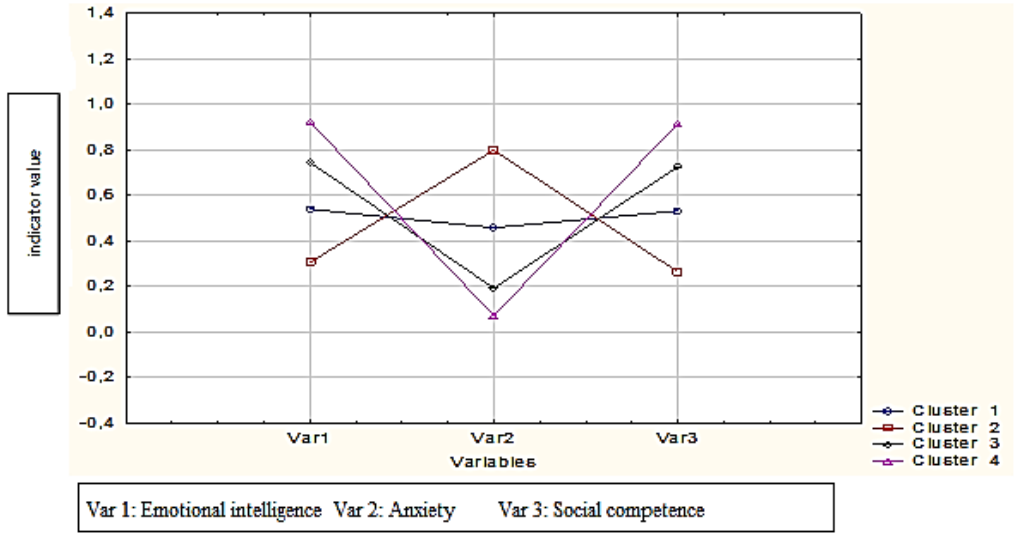


Figure 3: Variability of formed clusters of types of emotional intelligence development

As can be seen from table 2, 37% of the surveyed public servants belong to the "specialist/worker" type of emotional intelligence development, 27% correspond to the "pupil/student" type, 20% of public servants belong to the "professional/manager (leader)" type, and 16 % – corresponding to the "child" type. These findings support our hypothesis that there is a presence of more than three types of emotional intelligence models in the hierarchy of the division of public servants during the COVID-19 pandemic according to indicators of emotional intelligence, anxiety and social responsibility.

Discussion

Our findings identified four distinct clusters - “Child,” “Pupil/Student,” “Specialist/ Worker,” and “Professional/Manager”— each representing unique combinations of emotional intelligence, anxiety, and social competence levels. Notably, public servants in the “Child” cluster displayed low emotional intelligence and high anxiety, which significantly impeded their professional growth and adversely affected the overall psychological climate within their teams. Such individuals necessitate interventions to enhance their emotional intelligence through training, mentoring, and work-life balance initiatives. These results align with existing literature that emphasizes the impact of emotional intelligence on professional effectiveness and team dynamics (Goleman, 1997; Podolchak, Tsygylyk and Dziurakh, 2022; Popadynets *et al.*, 2021; Prykhodko *et al*., 2021). However, our study faces limitations due to its small sample size and the self-reported nature of data, which may not capture the full complexity of emotional intelligence dynamics in workplace settings. Future studies could expand the sample size and explore the integration of behavioural assessments to corroborate self-reported data.

Our findings contribute to the understanding of emotional intelligence in public administration, suggesting that enhanced emotional intelligence can significantly improve public servants' effectiveness and adaptability. This research underscores the necessity for ongoing professional development programs tailored to different emotional intelligence levels, particularly in challenging contexts like the pandemic. Additionally, considering the global relevance of emotional intelligence in diverse professional settings, further research could explore comparative studies across different cultures and administrative frameworks to enhance the generalizability of these findings.

Increasing the level of emotional intelligence is associated with decreased anxiety and enhanced social competence, facilitating progression from the "Child" developmental type to the "Pupil/Student" stage and potentially onward to "Specialist/Worker" and "Professional/Manager" levels. This progression reflects a dynamic where enhanced emotional management capabilities lead to improved interpersonal and professional outcomes (Goleman, 1997). Continuous effort in developing emotional intelligence is crucial for transitioning through these stages, highlighting the transformative impact of emotional intelligence on personal and professional growth (Salovey and Mayer, 1990). The "Pupil/Student" type cluster consists of public servants who exhibit balanced emotional intelligence, emotion management, and social competence, generally at a moderate level. This group is characterized by a positive orientation towards professional development, demonstrating openness to learning and adapting through educational opportunities, professional training, and mentoring (Podolchak *et al.*, 2022). While this development stage is promising, these individuals are still influenced significantly by their environmental context, which can lead to variability in their performance and task handling (Prykhodko *et al*., 2021).

Those in the "Specialist/Worker" cluster display an average ability to manage emotions, corresponding to moderate levels of anxiety and social competence. They are generally effective in their roles and contribute positively to the team's psychological climate. However, there is room for further development in emotional intelligence and social skills to achieve optimal effectiveness and adaptability in their professional roles

(Popadynets *et al*., 2021). Implementing targeted training and continuous professional development can significantly enhance the capabilities of public servants, leading to improved individual performance and overall organizational health (Mayer, Salovey and Caruso, 2008). These findings suggest that fostering emotional intelligence in public administration is not only beneficial but essential for professional success and a positive workplace environment. Future studies should focus on longitudinal assessments to better understand the long-term impacts of emotional intelligence development on public service efficiency and effectiveness.

Based on the above, the following methods should be used for the development of emotional intelligence, reduction of anxiety and improvement of social competence for public servants who belong to the type of "pupil/student" and "specialist/worker": communication training, stress management techniques, work on social skills, feedback, maintaining a positive working atmosphere, development of leadership skills, healthy balance of work and life, learning throughout life. These findings are consistent with established research in the field of emotional intelligence and its impact on workplace behaviour and performance. Key contributions by Goleman (2007), Yelkikalan *et al*. (2012), Lazarus (1991), Gasiul (2007), and Podolchak *et al.* (2022) underline the significant role that emotional intelligence plays in enhancing individual adaptability and overall organizational effectiveness. Their research supports the notion that increased emotional intelligence is crucial for reducing anxiety, improving social competence, and facilitating progression through various developmental stages within the public service sector.

Public servants who belong to the "professional/manager" cluster in terms of the level of emotional intelligence development have a high value of managing emotions (ie, low anxiety), social competence, and a high level of emotional intelligence. They perform tasks as efficiently as possible and contribute to maintaining a healthy psychological climate in the team. Moreover, these public servants can be mentors for the development of emotional intelligence for the types of "child", "student/pupil", and "specialist/worker" and are the driving force in the performance of assigned tasks. These public servants can reduce the negative impact of COVID-19 on the personnel of the organization through their activities. However, they should also not forget about the principle of lifelong learning to maintain their skills and abilities at a high level. These findings are consistent with established research in the field of emotional intelligence and its impact on workplace behaviour and performance. Key contributions by Goleman (2007), Yelkikalan *et al*. (2012), Lazarus (1991), Gasiul (2007), and Podolchak *et al*. (2022) underline the significant role that emotional intelligence plays in enhancing individual adaptability and overall organizational effectiveness. Their research supports the notion that increased emotional intelligence is crucial for reducing anxiety, improving social competence, and facilitating progression through various developmental stages within the public service sector.

Research on the level of emotional intelligence and its impact on the effectiveness of assigned tasks remains an ongoing area of inquiry. Enhancing emotional intelligence is crucial not only for personal growth and organizational effectiveness but also plays a significant role in sustainable natural resource management. By fostering an emotionally intelligent workforce, public organizations are better equipped to adapt to

environmental, social, and economic challenges, thereby contributing significantly to the United Nations Sustainable Development Goals. For instance, emotionally intelligent leaders in public agencies can manage resources more effectively, make informed decisions that promote sustainability, and ensure that development strategies prioritize ecological balance and social equity. A study by Smith and Lazarus (2018) demonstrated that organizations with higher levels of emotional intelligence among their staff were more successful in implementing sustainable practices. These organizations tended to have better teamwork and communication, leading to more innovative solutions for environmental management. Moreover, integrating emotional intelligence into the training programs of public servants can enhance their responsiveness to the complex dynamics of climate change, economic shifts, and social inequalities. This integration aligns with findings from Jones *et al.* (2020), who found that public sector employees with high emotional intelligence were more adept at navigating the complexities of policy implementation related to sustainable development, particularly in multi-stakeholder environments.

Thus, the ongoing research underlines the importance of emotional intelligence in fostering a public sector that is not only effective in its immediate tasks but also competent in advancing broader sustainability objectives. This strategic approach ensures that development strategies are not only effective but also inclusive and equitable, further enhancing the long-term sustainability of natural resources and community livelihoods. Enhancing emotional intelligence in public organizations supports their adaptability to environmental, social, and economic challenges, thereby contributing significantly to the United Nations Sustainable Development Goals (SDGs). This alignment is crucial as emotionally intelligent leaders are better equipped to manage the complexities of sustainable resource management and policy implementation. For instance, their ability to handle stress and engage stakeholders effectively facilitates progress toward climate action (SDG 13), promotes sustainable cities and communities (SDG 11), supports good health and well-being (SDG 3), and fosters partnerships (SDG 17). Research on the level of emotional intelligence and its impact on the effectiveness of assigned tasks is ongoing, highlighting that higher emotional intelligence not only aids in personal and organizational effectiveness but also ensures that development strategies consider ecological balance and social equity. This ongoing inquiry underscores the role of emotional intelligence in making informed decisions that promote sustainability, manage resources more effectively, and advance broader sustainability objectives. The study has broader implications for targeted interventions for the "Child" group - training programs to foster emotional regulation and social competence; for the "Pupil/Student" group: Support for professional skill-building and emotional stability; for the "Specialist/Worker" group - enhancements to empathy and leadership skills; and for the "Professional/Manager" group - strategies to sustain high performance and minimize stress.

Conclusion

In this study, we developed a typology model of emotional intelligence using cluster analysis to explore how emotional intelligence can influence the performance of public servants during the COVID-19 pandemic. Our hypothesis questioned whether different levels of emotional intelligence affect their capability to handle workplace demands

effectively. The analysis categorized public servants into four developmental types: "child", "pupil/student", "specialist/worker", and "professional/manager". Each category demonstrates distinct levels of emotional intelligence, anxiety, and social competence. Implementing this model can enhance decision-making, stress management, and interpersonal skills, crucial for addressing the complex challenges of sustainable natural resource management. By improving emotional intelligence, public servants can more effectively implement sustainable practices, contributing to the broader goals of the Sustainable Development Goals by promoting ecological balance and social equity. For ongoing professional enhancement, targeted training and educational programs are essential. These should focus on communication training, stress management, and developing leadership skills to continuously improve the emotional and social competencies of public servants. Future studies should investigate the applicability of this emotional intelligence development model in the post-COVID-19 era and perform a comparative analysis to validate the current findings. While the results are recommendatory and provide a basis for informed decision-making, they should not be seen as conclusive for evaluating the overall effectiveness and efficiency of public servants. By integrating emotional intelligence frameworks within public administration, we can foster a more resilient and adaptive workforce, capable of managing both current and future environmental and social challenges effectively.

Acknowledgements

This paper was created within the National Research Foundation of Ukraine project, assessing the impact of the COVID-19 pandemic on Ukraine's human resources and identifying ways to overcome them.

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Authors' Declarations and Essential Ethical Compliances

Authors' Contributions (in accordance with ICMJE criteria for authorship)

Contribution	Author 1	Author 2	Author 3	Author 4
Conceived and designed the research or analysis	Yes	No	Yes	Yes
Collected the data	Yes	No	Yes	No
Contributed to data analysis & interpretation	Yes	Yes	No	Yes
Wrote the article/paper	Yes	Yes	No	No
Critical revision of the article/paper	No	Yes	No	Yes
Editing of the article/paper	No	Yes	Yes	No
Supervision	No	Yes	No	Yes
Project Administration	Yes	No	No	No
Funding Acquisition	No	No	No	No
Overall Contribution Proportion (%)	25	25	25	25

Funding
No financial support was received for the research and writing of this article.

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The author(s) solemnly declare(s) that this research has not involved any human subject (body or organs) for experimentation. It was not a clinical research. The contexts of human population/participation were only indirectly covered through literature review. Therefore, an Ethical Clearance (from a Committee or Authority) or ethical obligation of Helsinki Declaration does not apply in cases of this study or written work.

Research involving animals (ARRIVE Checklist)
The author(s) solemnly declare(s) that this research has not involved any animal subject (body or organs) for experimentation. The research was not based on laboratory experiment involving any kind animal. The contexts of animals were only indirectly covered through literature review. Therefore, an Ethical Clearance (from a Committee or Authority) or ethical obligation of ARRIVE does not apply in cases of this study or written work.

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